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engineering

ENGINE STORAGE

STURTEVANT

Mill Company Boston

Crushing - Grinding -



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Section No. *52.*

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Department of Mining Engineering



1908

STURTEVANT MILL CO. BOSTON MASS.

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PLAIN BALANCED ROLLS

Crushing and Grinding Machinery



STURTEVANT MILL CO.

MANUFACTURERS AND DEALERS]

Works and Offices, - Boston, Mass., U. S. A.

BRANCH OFFICES

New York

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STURTEVANT ENGINEERING CO., Ltd.

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AGENCIES

Norway

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Russia

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Chili

PLAIN BALANCED ROLLS

THE LARGEST LINE OF ROCK AND ORE

Crushing, Granulating, Pulverizing, Grinding and Screening Machinery Built

From which may be selected machines of the best types applicable to every material and condition.

Principal Machines and the Catalogue number in which they will be found.

CRUSHERS		PULVERIZERS AND GRINDING MILLS	
	Catalogue No.		Catalogue No.
Jaw Breakers	69-73	Ore Mills	68
Gyratory Breakers	75	Chilian Mills	68
Steel Rock and Ore Breakers	69	Huntington Mills	68-72
Blake Crushers	73	Sectional Mills	68-72
Rock Smashers	69	Stamp Mills	68
Duplex Coarse Breakers	69	Ball and Tube Mills	76
Duplex Intermediate Crushers	69	Pan Mills (Wet and Dry)	71
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Roll Jaw Fine Crushers	62	Vertical Emery Mills	64
Rotary Fine Crushers	63	Rock Emery Millstones	64
"Open Door" Crushers	63	Buhr Mills	64
"Open Top" Crushers	63	Sample Grinders	67
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ROLLS		POWER	
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IMPORTANT

Machines, conditions, and materials, vary so greatly that we request as complete information as possible when asked for quotations. Then we can answer intelligently, and specify the size and type of machine best suited to requirements:—

INFORMATION REQUESTED

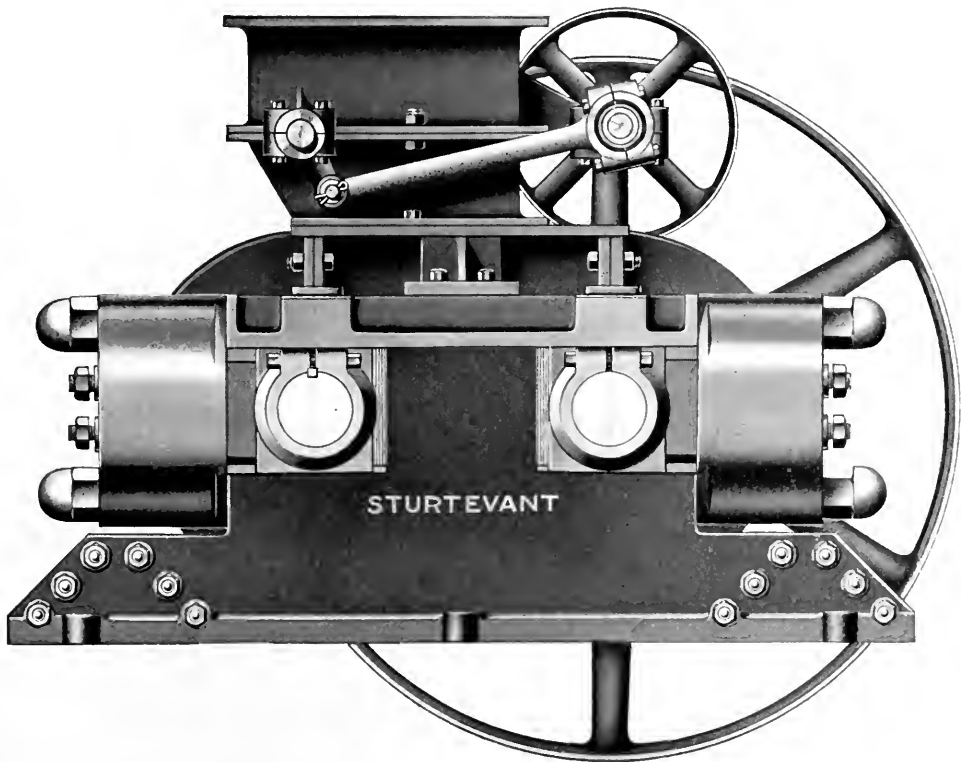
What MATERIAL (to be handled): its CONDITION (wet or dry): its CHARACTER (hard or soft): its SIZE (before feeding to machine): the FINENESS of product wanted: the CAPACITY required in tons per HOUR: what MACHINES ARE NOW BEING USED.

TESTING ROOM

This department is thoroughly equipped with constructions of *full size*, and tests *opinions* as well as *machines*. Patrons bring all sorts of material to be reduced, and decisions are frequently made of great importance. The output and adaptability of any machine need seldom be a matter of doubt, because tests here can be made as thoroughly as required.

Samples sent will be reduced *free* if transportation is prepaid. Manufacturers do well to come themselves or send a representative to make tests.

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

With Case and Feeder.

Rigid Tie Bar Design, Automatic Feeder, Portable Construction, Car
Box Bearings, Perfectly Balanced.

PLAIN BALANCED ROLLS



TURTEVANT ROLLS are built in two styles—*Balanced Rolls* and *Plain Balanced Rolls*. The former are fully shown and described in catalogue No. 65, and the Plain Balanced Rolls in this booklet. The regular Balanced Roll is a great, massive machine, in which *no expense* has been spared to make it *the best*. They are of enormous weight, have automatic adjustments, and such high-class appliances as are seen in no other rock-reducing machines.

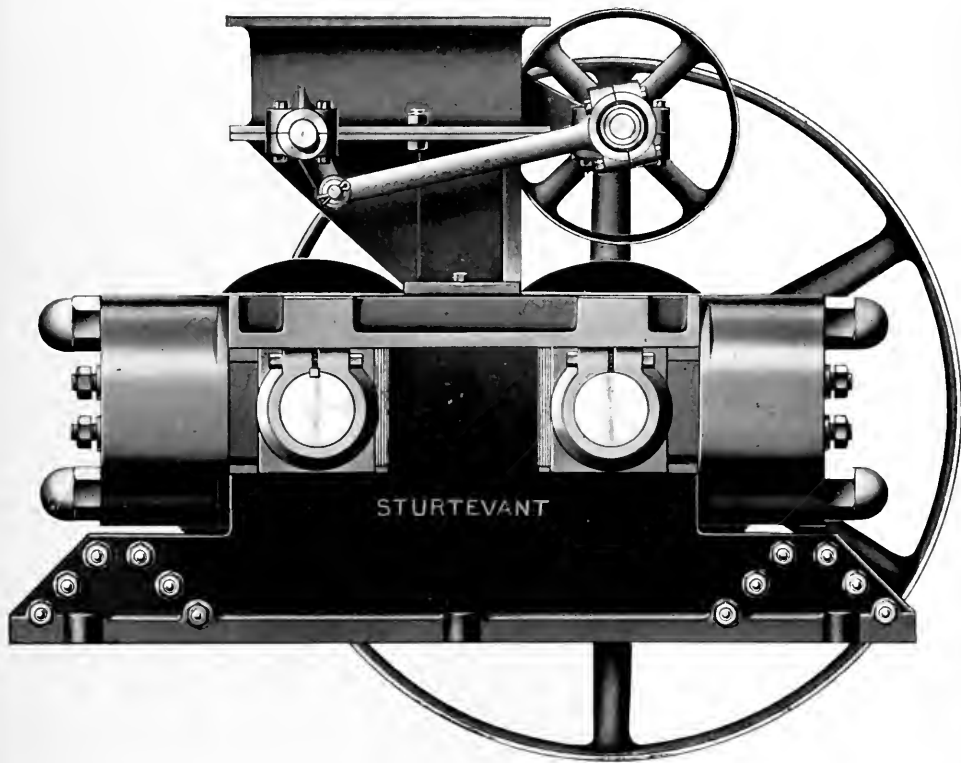
Plain Balanced Rolls are *equally good in essential features*. The corresponding shafts, bearings, tires, etc., are of the same quality, size and workmanship; but instead of relying upon cast iron of great weight for strength, as with Balanced Rolls, in these machines the stresses are taken by immensely strong, *steel tie-rods*. These require no pedestals, and the *gross weights are less than one-half* that of the other machines which are no stronger, and the price is accordingly less. Thus there is no sacrifice of strength. *No stronger Rolls have ever been built*.

The *automatic adjustments* of Balanced Rolls are in Plain Balanced Rolls replaced by a new and perfect shim.

A *strong and thoroughly good* machine has in this way been produced that can be sold at a popular price, and they have every essential feature of the Balanced Rolls, which have done so much to make our reputation. Like the Balanced Rolls, these are *perfectly balanced*, have the same great car-box bearings, but in this case held by four massive steel tie-rods *with no pedestals* and side plates that never require *change of position*, patent expanding roll hearts that do not require removing when the tires are replaced, the Sturtevant Patent Feeding Device, and the best shim arrangement to be found on Rolls.

That Plain Balanced Rolls cannot be adjusted (as can the Balanced Rolls) *when running* is conceded, but they are as convenient to operate as any others, and the regulating *shims* are of an improved type, which, while changing Roll *distances*, do not change roll *pressures*, unless it is desirable to do so.

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

With Automatic Feeder but without Case or Housing.

A simple Roll of ample proportions, adapted for the hardest work.

PLAIN BALANCED ROLLS

PORTABILITY

Plain Balanced Rolls have one feature *absolutely peculiar to themselves*. They are portable. As in Sturtevant Crushers, this great advantage has been attained *without any sacrifice of strength or rigidity*. In fact, they are absolutely the strongest Rolls we know of, and yet may, even in the largest size, be taken down *by two men*, and *no part is too heavy to be carried in a farm wagon* over bad roads and weak bridges—an advantage always appreciated by buyers carrying into difficult situations. The savings made over the usual *hauling-in* and *setting-up* costs of common Rolls is a profit in itself, frequently equalling the factory price.

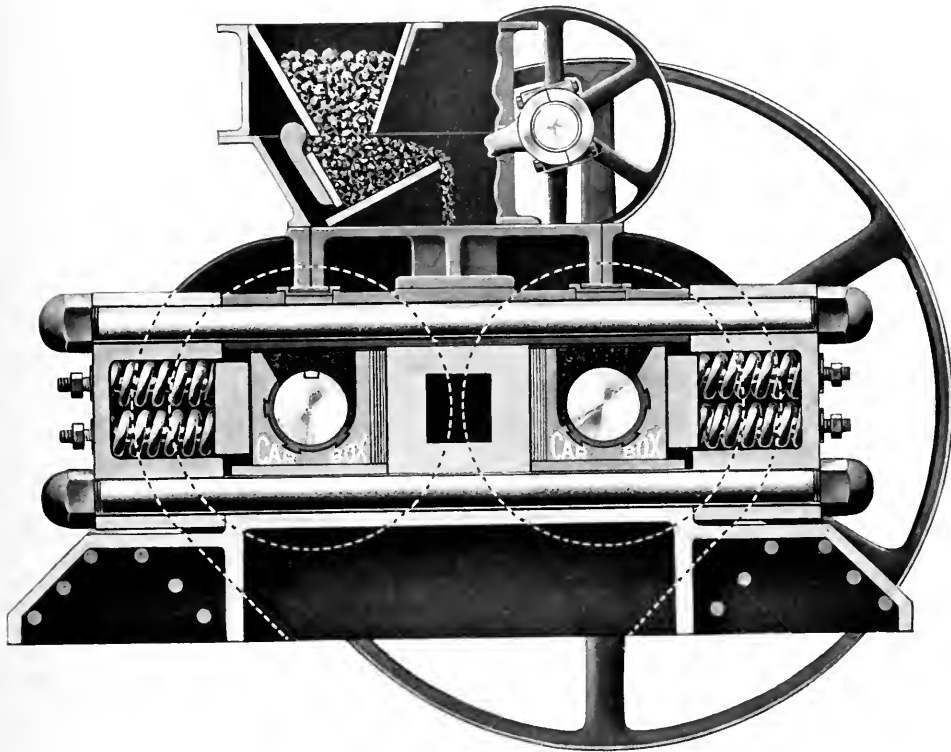
We call the attention of engineers to the scientific features of this design, which for balance, strength, rigidity, convenience and economy of handling, and moderate cost, it is believed is not matched by any heretofore produced.

All Balanced Rolls are distinctive Sturtevant inventions and combine the best features of the *Spring* and *Rigid* types, having the faults of neither. They are *rigid* to all ore or rock breaking stresses, yet have instant relief should iron or other uncrushable material get between the tires. No throwing of belts, caused by overfeeding, as in absolutely rigid constructions, nor liability to breakage; neither are they subject to the shocks caused by the excessive reciprocation of ordinary Spring Rolls, and since balancing eliminates shocks, the shafts never crystalize and break.

Springs of any strength required can be placed back of *all four bearings*, allowing each to move back *in relief*, and they move *equally* and *oppositely* at the *same time*, thus exactly balancing and offsetting each other's movements. These springs act as a *safety*, like the breaking piece in some Crushers, and they are stiff enough to crush the hardest ore, yet flexible enough to prevent accidents.

It is sometimes objected to Spring Rolls that their outputs contain excessive quantities of "*oversize*," which requires to be *screened out* and returned at considerable cost. All this is true of some Rolls. To avoid this fault some makers attempt absolutely rigid, *springless Rolls*. Such cannot separate and

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

NOTICE:—Balanced Design. Massive Tie Bar Construction, which is rigid and unbreakable. Car Box Bearings, simple and Dust Proof, strong springs back of each shaft and bearing. Strength of Anvil Block in center. Automatic Swing Feeder. Improved Shim adjustment. Simplicity and strength of Portable Design.

PLAIN BALANCED ROLLS

let out oversize, or in fact anything else, consequently if overfed, or if an uncrushable substance gets between the Roll faces, the machine *must break* or *stop*. Great care, therefore, is exercised. A safety breaking piece has been used by a few makers, but this *breaks too often* if it is *weak* enough, and if the breaking piece is *too strong* the roll-frame or shafts suffer, or the machine is stalled. It is not surprising, therefore, that these conditions have generally led to the abandonment of Rigid Rolls.

ADVANTAGE OF RIGID ROLLS

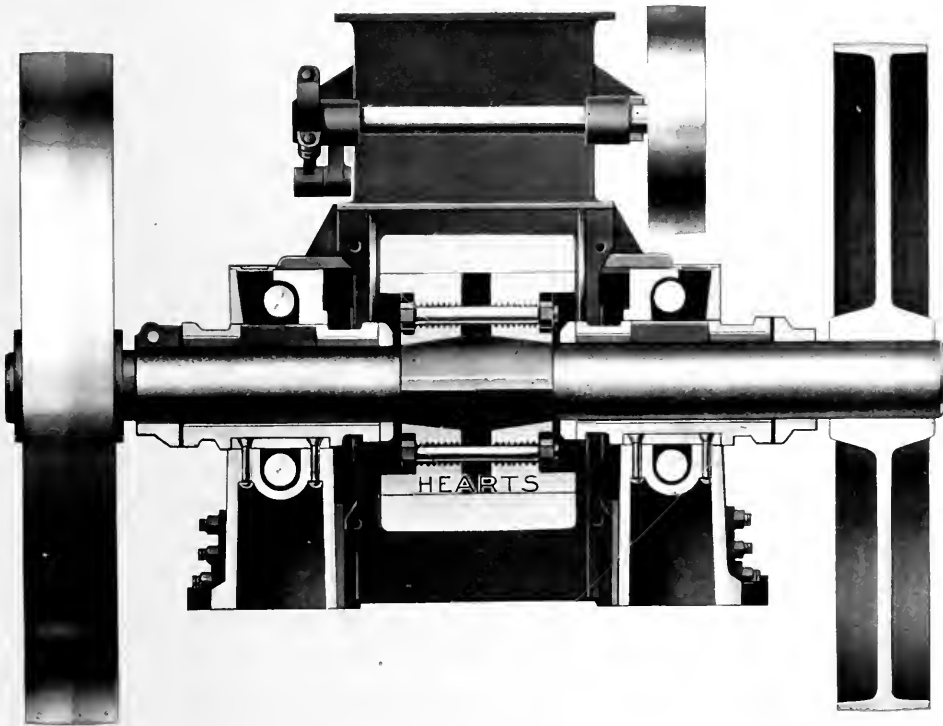
There is one advantage the springless Rigid Roll can claim—it is *cheap*; and only one objection—that it is absolutely rigid. It is called upon *to resist the irresistible*. It always runs hard; and on most materials with heated bearings, and often attains a bent or broken shaft, and not infrequently, unless it stops, a *broken back*. Balanced Rolls have *as much rigidity as is useful or safe*.

It would be serious indeed, if it were *necessary* to produce springless Rolls in order to obtain desirable rigidity; but, fortunately, rigidity is easily attained with springs, and as much rigidity as is wanted. It is only a question of spring *strength*. The massive springs usually used in Balanced Rolls are inflexible to rock. They crush the strongest with ease. These Spring Rolls are built to endure the hardest work. All Balanced Rolls are designed for *every degree* of *rigidity* or *flexibility* wanted, and always, when the time comes that they must either *retreat* or *break*, they do not break.

DEFINITION OF BALANCED ROLLS

Balanced Rolls are those in which all the shock movements of crushing are made in opposite directions at the same speed, at the same time, and with equal force; these movements thus exactly counteract and offset each other. They run with so little vibration that no special foundation is required. They can run safely on any strong mill floor.

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

NOTICE:—Size of Shaft and Bearings. Patent expanding Hearts which are not removed when replacing shell or tire. Taper on Shaft but not on Shell. Generous proportions of essential parts.

PLAIN BALANCED ROLLS

DESIGN

They are designed on the following principles:

- 1st: that the fewest possible parts shall move at all.
- 2d: that the speed of parts moving to shock shall be low.
- 3d: that parts moving oppositely shall have equal weight.
- 4th: that parts moving oppositely shall have equal speed.
- 5th: that opposite movements shall be made at the same time.
- 6th: that such shocks as are unavoidable shall be cushioned by springs.

We believe our engineering friends agree that by building on these lines we have introduced types remarkable for durability and easy running. Each point appeals to the common sense of every reader.

HEARTS

The new expanding heart is an improvement worthy of high class rolls. *The shaft is tapered*, instead of the Roll Shells, as in others, thus strengthening the shaft, and permitting the shell or tire to be replaced *without removing the heart*. By using the set screws supplied with the Rolls, the expanding hearts are loosened, and the shell may be easily slipped off, or on. The shells are held firmly in position by *setting up on the through bolts*, and *never loosen*.

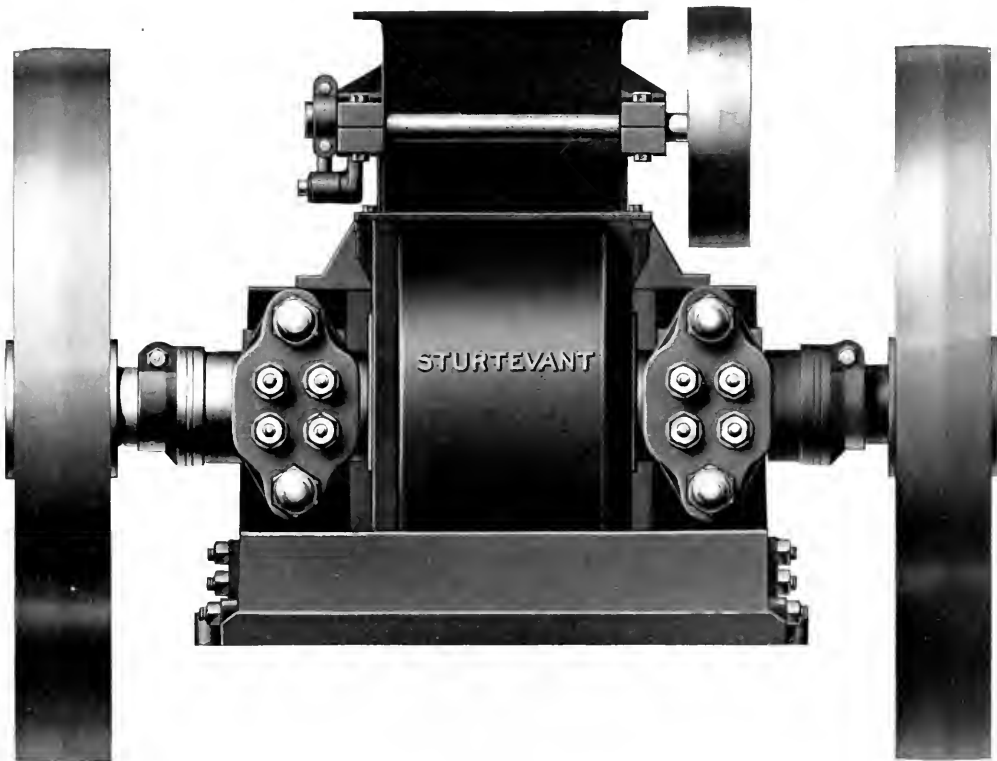
SHOCKS QUARTERED

In Balanced Rolls the shocks that are unavoidably produced are QUARTERED: that is, they have only *one-quarter* the usual severity.

WHY ?

Because the opposite Rolls move apart *equally* under excessive stresses; each Roll moves only *half as far* as common Rolls; for usually *one* is *fixed on the frame*, and the *other* (with its massive pedestals) makes *all the moves*. A common Roll shaft consequently has to go *back*, or *forward*, *twice as far* in the same time: *i.e., twice as fast*. The shock of this longer and more rapid

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

With Case and Automatic Feeder. Portable Design. Transportable in the largest sizes over rough roads by ordinary farm wagons and reassembled by two men with only the usual appliances.

PLAIN BALANCED ROLLS

movement equals the mass multiplied by the square of the velocity (MV^2); this figures *FOUR*; hence the shocks suffered by STURTEVANT BALANCED ROLLS (moderately stated) *are of only one-quarter* the usual severity. But they are really greatly less than this, because no Balanced Roll carries a heavy pedestal when it reciprocates, as do all Rolls of common type. Even if STURTEVANT ROLLS were not balanced they would have great advantage over others, because the moving parts are *fewer*, and *of less weight*. *Balancing* adds immeasurably to *durability*.

SIDE PLATES

Because both Rolls move *equally apart*, or *together*, the *crushing line never varies*, and no change of position of the side plates is required.

CAR-BOX ELASTIC BEARINGS

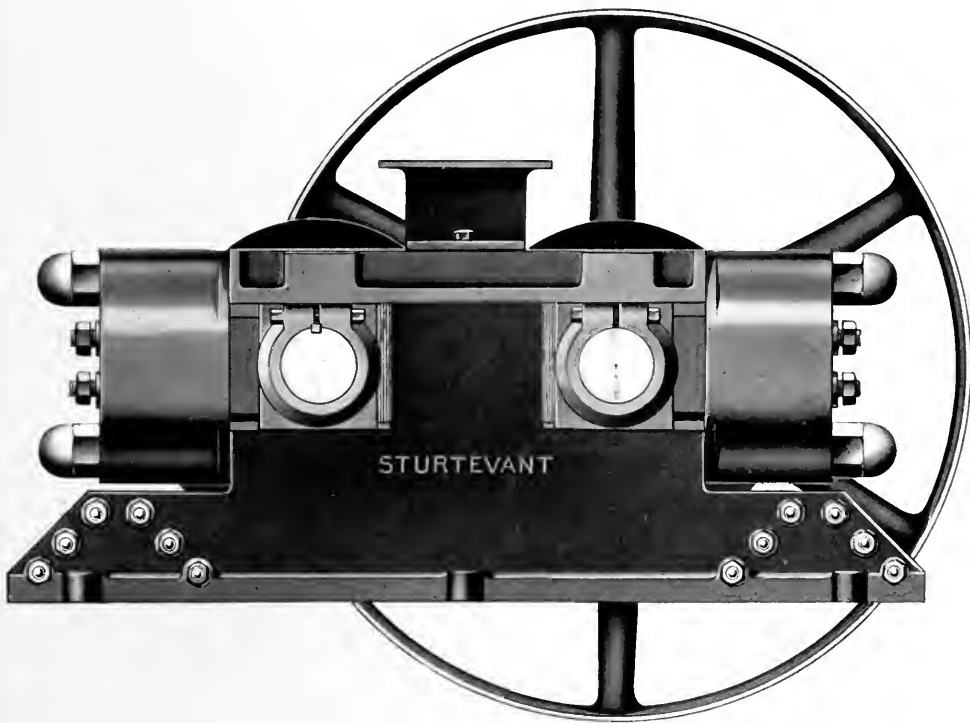
Too much cannot be said in praise of this improvement in Rolls. The car-box is certainly the most reliable bearing known to mechanics. It requires the least attention, endures the hardest usage, withstands safely, and *cushions* the heaviest shocks, and is dust-proof. It is also flexible to the shaft movements, and cannot *cramp* the shaft. The car-box is cushioned by the heavy pedestal springs, exactly as in a railway car, and the shocks are spring *softened in an equal degree*.

This is distinctively a Sturtevant design, and we are proud of it. The car-box on railway axles operating under most trying conditions of shock and dust, has superseded all other bearing devices, *and it is no less effective in Rolls*.

NO PEDESTAL WEAR

Because *there are no pedestals* in Plain Balanced Rolls. The comparatively light *car-boxes* take the place of the heavy pedestals of common Rolls that cause the rapid wear of expensive frame parts upon which they move.

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls.

Without Case or Feeder.

PLAIN BALANCED ROLLS

CHANGING TIRES EASY

Removing the car-box *caps*, and turning up the nuts on the spring tension regulating bolts, releases the car-box: then the shaft and box may be lifted out. The tire is then easily removed from the head. But when the Rolls are in use, the nuts on the tension bolts must be turned back or removed.

SHAFTS

Forged high carbon steel, fitted with Sturtevant Patent Expanding Hearts, permit the Roll shells to be removed or replaced, without removal of the hearts.

BEARINGS AND DUST EXCLUDERS

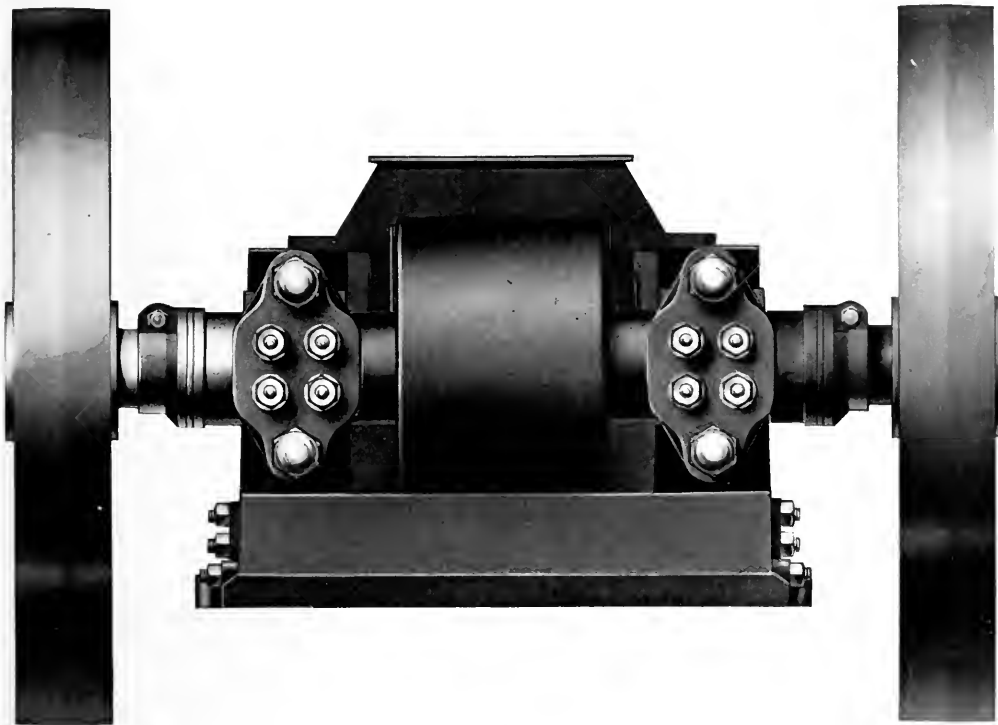
Car-box type, babbitted, of generous proportions, with babbitt dove-tailed in, and all parts interchangeable; spring, and self-adjusting dust-collars thoroughly protect these bearings from dust and dirt.

ADJUSTMENTS

Roll setting is accomplished by placing shims between bearings and the anvil block of bed; special bolts are provided for slightly compressing the springs, thus removing their pressure and permitting the shims to be taken *from one side of the box and placed at the other side*. By this method the *spring pressure* remains constant.

The side adjustment, to prevent tire grooving, is obtained by the special Clamp Collar Device.

PLAIN BALANCED ROLLS



Patented

20 x 14 Plain Balanced Rolls
Without Case or Feeder

PLAIN BALANCED ROLLS

FEEDER

A Sturtevant Swing Feeder, with removable steel lining plates, gives the Rolls a constant, even feed.

TIRES

Forged, .85 carbon steel, are turned throughout.

SIZES

Plain Balanced Rolls are made in many sizes; therefore please specify which of the following arrangements is desired:

Roll complete with case and automatic feeder.

With case and without feeder.

Without case and with feeder.

Without case and without feeder.

Specifications Plain Balanced Rolls.

Size inches	Code Word	Pulley dia. and face, inches	Approx. H. P.	Speed R. P. M.	Length over all, inches	Width over all, inches	Height over all, inches	Approx. wt. heaviest piece, lbs.	Approx. wt. without case or feeder, lbs.	Approx. gr. wt. with- out case or feeder, lbs.	Approx. add. wt. with case	Approx. add. wt. with feeder
*12 x 12	PLAG	36 x 6	4	150-200	42	51	29	450	3200	3600	0	150
20 x 14	PLEM	48 x 6	8	100-150	62	64	40	462	7500	8200	700	300
22 x 14	PLIP	48 x 6	8	100-150	62	64	40	462	7800	8500	700	300
30 x 16	PLIG	66 x 10	12	75-125	92	93	54	1200	15000	16000	1200	500
32 x 16	PLIK	66 x 10	12	75-100	92	93	54	1200	15500	16500	1200	500
36 x 16	PLID	66 x 10	15	50-100	104	93	54	1200	20000	21500	1500	500
38 x 16	PLISS	66 x 10	15	50-100	104	93	54	1200	20700	22200	1500	500

* Also made sectional for mule-back transportation, no part weighing over 359 lbs.

† If with case prefix CA to code word.

Feeder affix FE

case and feed make both above additions

